Space Weather Technical Forecast

Issued on Saturday 8 March 2025 at 00:25 Local

This technical forecast provides a four-day assessment of space weather events. The probabilities stated below are for reaching or exceeding the given levels. For more information about space weather impacts please see the Met Office Space Weather Scales https://www.metoffice.gov.uk/weather/learn-about/space-weather/uk-scales

---

Space Weather Forecast Headline: Chance of M-class flares (R1-R2; Minor-Moderate radio blackouts) throughout. G1/G2 likely Days 1/2.

Analysis of Space Weather Activity over past 24 hours

Solar Activity: Solar activity has been Low with occasional low level C-class activity in the past 24 hours.

There are currently up to seven sunspot regions on the visible solar disc. AR4012 in the south centre disc remains the largest region but is showing decay in its intermediate and trailer spots in recent imagery. AR4016 to the southeast is also exhibiting decay. AR4018 located toward the southeast limb, consists of a moderately large lead spot with some recently emerged small trailer spots. AR4007 has now almost rotated off the southwest limb. However, a new single Hsx/Alpha spot is now visible at the northeast limb. Remaining spots are small, weak and either stable or in decay.

A small filament that lifted-off to the south of AR4012 around 07/0100UTC produced a CME. However, available imagery and initial modelling suggests a strong southerly component, and this is not expected to have any significant impact at Earth. A CME may have occurred in association with the M1.6 flare at 07/2100UTC from AR4016, but relevant coronagraph imagery is currently being awaited to determine if this has an earth-directed component.

Solar Wind / Geomagnetic Activity: Solar winds, as measured by ACE at L1, remained fairly steady throughout at slightly elevated levels around 400km/s. Solar wind density was at around average levels. The Interplanetary Magnetic Field was mainly Weak, and the north-south component was largely Weak and variable, between +7/-6nT. The phi angle was predominantly positive (away from the Sun). Geomagnetic activity was Quiet (Kp 0-2), as observed by BGS.

Energetic Particles / Solar Radiation: High energy proton flux (greater than 10MeV) at GOES18 was at Background.

High energy electron flux saw a rise in its diurnal oscillation, very briefly reaching high levels of 1030pfu at 07/1735UTC. The 24-hour fluence was below the Active threshold (1e8 integrated pfu), on a declining trend, recording 7.79e6 integrated pfu at 06/2359UTC.

Issued by Met Office Space Weather Advisor, Tel: +44 (0) 370 900 0100 Email: enquiries@metoffice.gov.uk

© Crown Copyright 2025. All Rights Reserved.

Four-Day Space Weather Forecast Summary

Solar Activity: Solar activity is expected to be generally Low, with a chance of further isolated M-class flares.

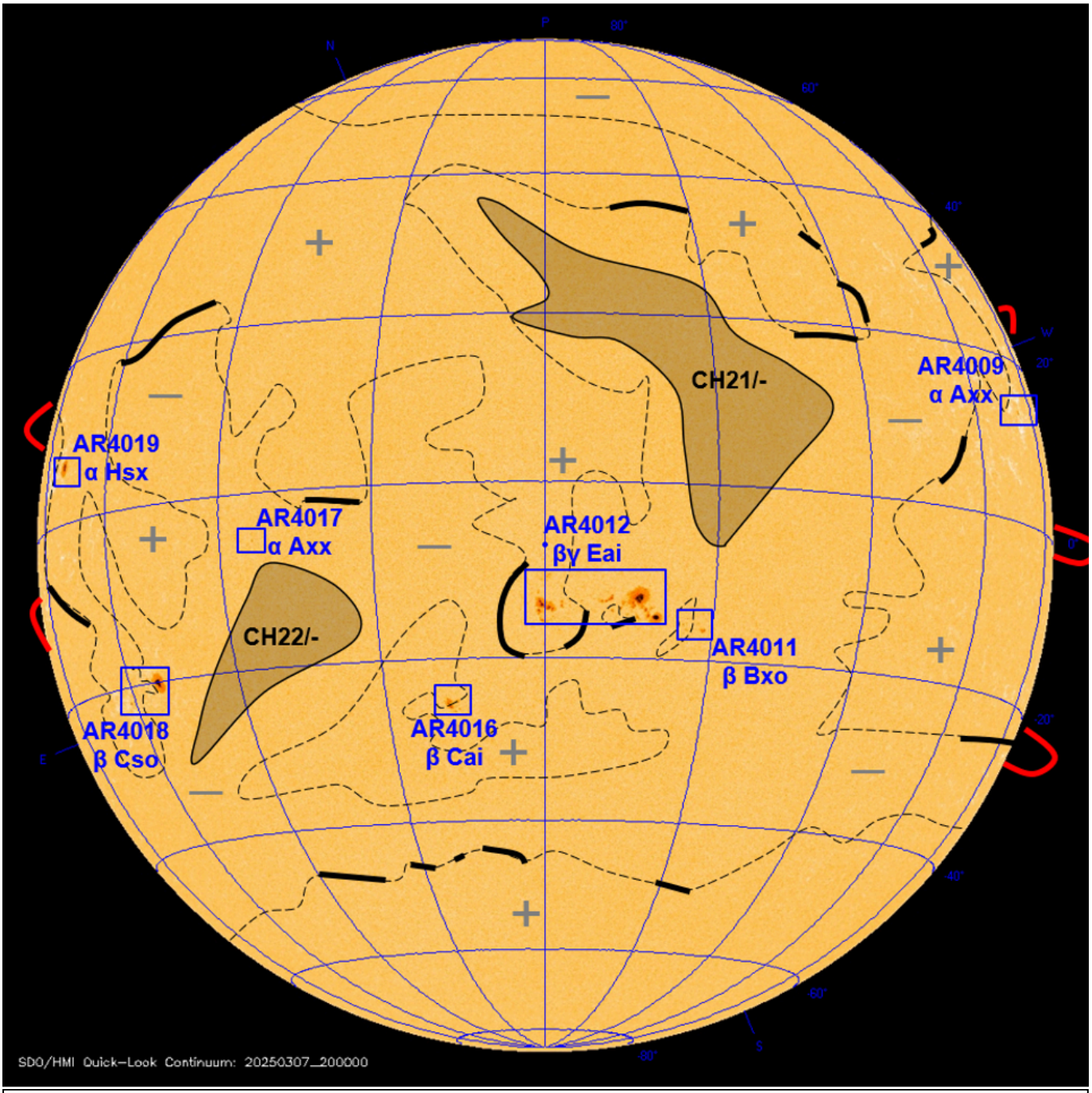
Solar Wind / Geomagnetic Activity: There are currently no Earth-directed CMEs in the forecast. Background solar winds are expected at first. During Day 1 (8 March) Earth is likely to connect with the High Speed Stream from CH21/-. Solar wind speeds are expected to increase to Elevated to Strong. Geomagnetic activity is expected to be Quiet to Unsettled (Kp 1-3) initially on Day 1 (8 March). However, later on Day 1 (8 March) and during Day 2 (9 March) periods of Active to G1/minor geomagnetic storm (Kp 4-5) are likely with a chance of isolated G2/Moderate geomagnetic storms (Kp 6). On Day 4 (10 March), periods of Unsettled to Active are likely with a chance of G1/minor geomagnetic storm (Kp 4-5).

Energetic Particles / Solar Radiation: High energy proton flux should remain at Background levels. High energy electron flux is likely to remain background to Moderate at first, but there is a chance of increasing toward High by Day 3. The associated 24 hour fluence is expected to remain below the Active threshold.

Issued by Met Office Space Weather Advisor, Tel: +44 (0) 370 900 0100 Email: enquiries@metoffice.gov.uk

© Crown Copyright 2025. All Rights Reserved.

Figure 1: Synoptic Solar Map 07/2000UTC



Key: Filament ___ , Prominence ___ , Magnetic Field Line - - - , Polarity +/-, Coronal Holes: Grey shaded area CHxx +/-, Sunspot groups 25xx - Mt Wilson α-β-βγ-βγδ and Zurich-McIntosh Axx etc.

Issued by Met Office Space Weather Advisor, Tel: +44 (0) 370 900 0100 Email: enquiries@metoffice.gov.uk

© Crown Copyright 2025. All Rights Reserved.

Geomagnetic Storms

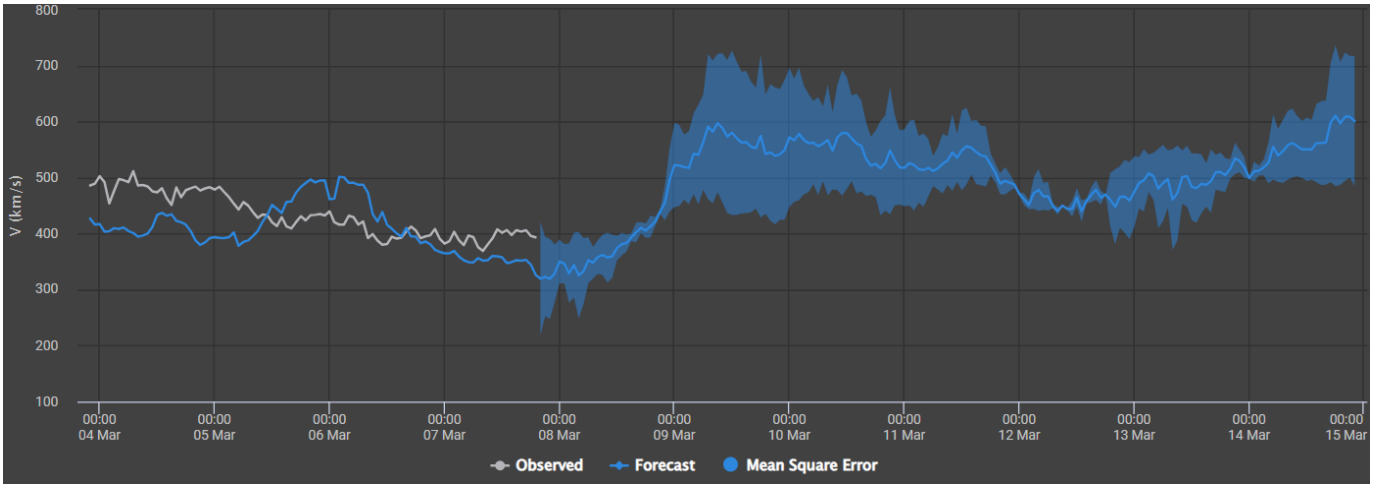
A CME may have occurred in association with the M1.6 flare at 07/2100UTC from AR4016, but relevant coronagraph imagery is currently being awaited to determine if this has an earth-directed component.

Slightly Elevated winds have declined towards Background. Later on Day 1 (8 March) Earth is expected to connect with the High Speed Stream from CH21/-. Elevated to Strong wind speeds are expected, this is supported by 27 day persistence and MOSWOC Enlil.

Geomagnetic activity is expected to be Quiet to Unsettled (Kp 1-3) for much of Day 1 (8 March). However, later in the day geomagnetic activity is expected to increase due to connection with CH21/-. Given that we are approaching the vernal equinox and G1/minor storm level was observed on the previous rotation, periods of Active to G1/minor geomagnetic storm (Kp 4-5) are likely, with a chance of isolated G2/Moderate geomagnetic storm (Kp 6) later on Day 1 (8 March) or during day 2 (9 March). On Days 3 and 4 (10-11 March), periods of Unsettled to Active are likely with a chance of G1/minor geomagnetic storm (Kp 4-5).

Geomagnetic Storm Probability (Exceedance)	Level	Past 24 Hours (Yes/No)	Day 1 (00-24 UTC) (%)	Day 2 (00-24 UTC) (%)	Day 3 (00-24 UTC) (%)	Day 4 (00-24 UTC) (%)
Minor or Moderate	G1 to G2	No	60	70	40	30
Strong	G3	No	10	10	5	1
Severe	G4	No	1	1	1	1
Extreme	G5	No	1	1	1	1

Figure 2: Persistence showing expected increase of solar winds due to fast wind from CH21/+



Issued by Met Office Space Weather Advisor, Tel: +44 (0) 370 900 0100 Email: enquiries@metoffice.gov.uk

© Crown Copyright 2025. All Rights Reserved.

Radio Blackouts - X-Ray Flares

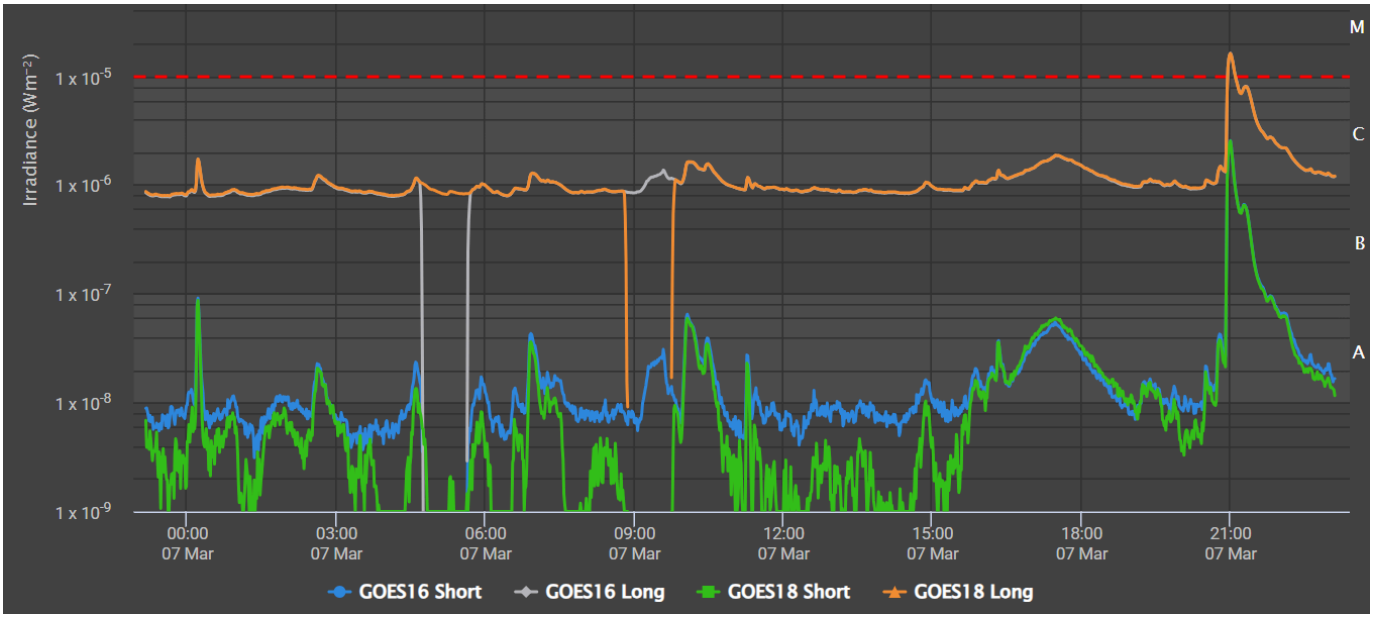
Solar activity has increased to moderate, due to an M1.6 flare at 07/2100UTC from AR4016.

There are currently up to seven sunspot regions on the visible solar disc. AR4012 in the south centre disc remains the largest region but is showing decay in its intermediate and trailer spots in recent imagery. AR4016 to the southeast is also exhibiting decay. AR4018 located toward the southeast limb, consists of a moderately large lead spot with some recently emerged small trailer spots. AR4007 has now almost rotated off the southwest limb. However, a new single Hsx/Alpha spot is now visible at the northeast limb. Remaining spots are small, weak and either stable or in decay.

Solar activity is expected to be generally Low, with a chance of further isolated M-class flares.

X-Ray Flares Probability	Level	Past 24 Hours (Yes/No)	Day 1 (00-24 UTC) (%)	Day 2 (00-24 UTC) (%)	Day 3 (00-24 UTC) (%)	Day 4 (00-24 UTC) (%)
Active	R1-R2 (M Class)	No	40	40	40	40
Very Active	R3-R5 (X Class)	No	5	5	5	5

Figure 3: GOES 18/16 X-ray flux



Issued by Met Office Space Weather Advisor, Tel: +44 (0) 370 900 0100 Email: enquiries@metoffice.gov.uk

© Crown Copyright 2025. All Rights Reserved.

Solar Radiation Storms (High Energy Protons)

GOES18 high energy (>10MeV) proton flux is at Background, and expected to remain at this level. There is a Slight Chance of an enhancement to S1 given any significant eruption from the sunspot regions currently on the Earth-facing disc.

Radiation Storms Probability (Exceedance)	Level ($cm^{-2}sr^{-1}s^{-1}$)	Past 24 Hours (Yes/No)	Day 1 (00-24 UTC) (%)	Day 2 (00-24 UTC) (%)	Day 3 (00-24 UTC) (%)	Day 4 (00-24 UTC) (%)
Active	**≥ S1**	No	5	5	5	5
Very Active	**≥ S3 ***	No	1	1	1	1
* S3 ≥ 10 MeV ≥ 1000 pfu and/or 50 MeV ≥ 10pfu. (pfu = $cm^{-2}sr^{-1}s^{-1}$)						

Issued by Met Office Space Weather Advisor, Tel: +44 (0) 370 900 0100 Email: enquiries@metoffice.gov.uk

© Crown Copyright 2025. All Rights Reserved.

High Energy Electrons (≥ 2MeV)

The high-energy electron flux (>2MeV), as observed at GOES16, has been Normal Background to Moderate which is expected to continue at first. There is an increasing chance of diurnally peaking towards High by Day 3 (10 March), following connection with CH21/-.

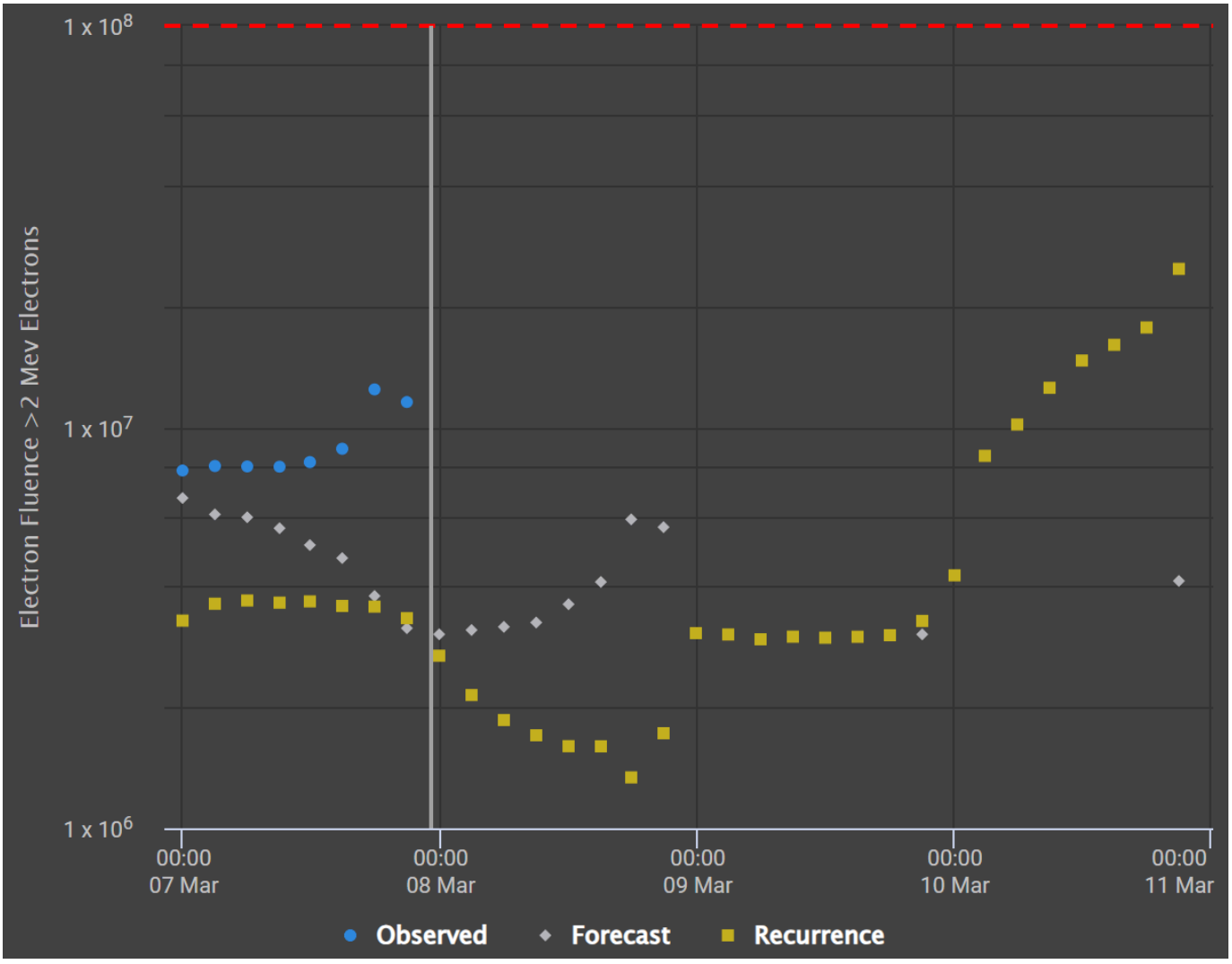
The associated 24-hour fluence is declining and is likely to remain below Active as indicated by MOSWOC REFM guidance output, perhaps with a rising trend developing on Day 3 (10 March).

GEO Electron Environment	Level ($cm^{-2}sr^{-1}$ day^{-1})	Past 24 Hours (Yes/No)	Day 1 (00-24 UTC)	Day 2 (00-24 UTC)	Day 3 (00-24 UTC)	Day 4 (00-24 UTC)
Probability (Exceedance)			(%)	(%)	(%)	(%)
Active	≥ 2 MeV ≥ 1×10^{8}	No	1	1	5	15
Very Active	≥ 2 MeV ≥ 1×10^{9}	No	1	1	1	1

Issued by Met Office Space Weather Advisor, Tel: +44 (0) 370 900 0100 Email: enquiries@metoffice.gov.uk

© Crown Copyright 2025. All Rights Reserved.

Figure 4: MOSWOC REFM



© Crown Copyright 2025. All Rights Reserved.